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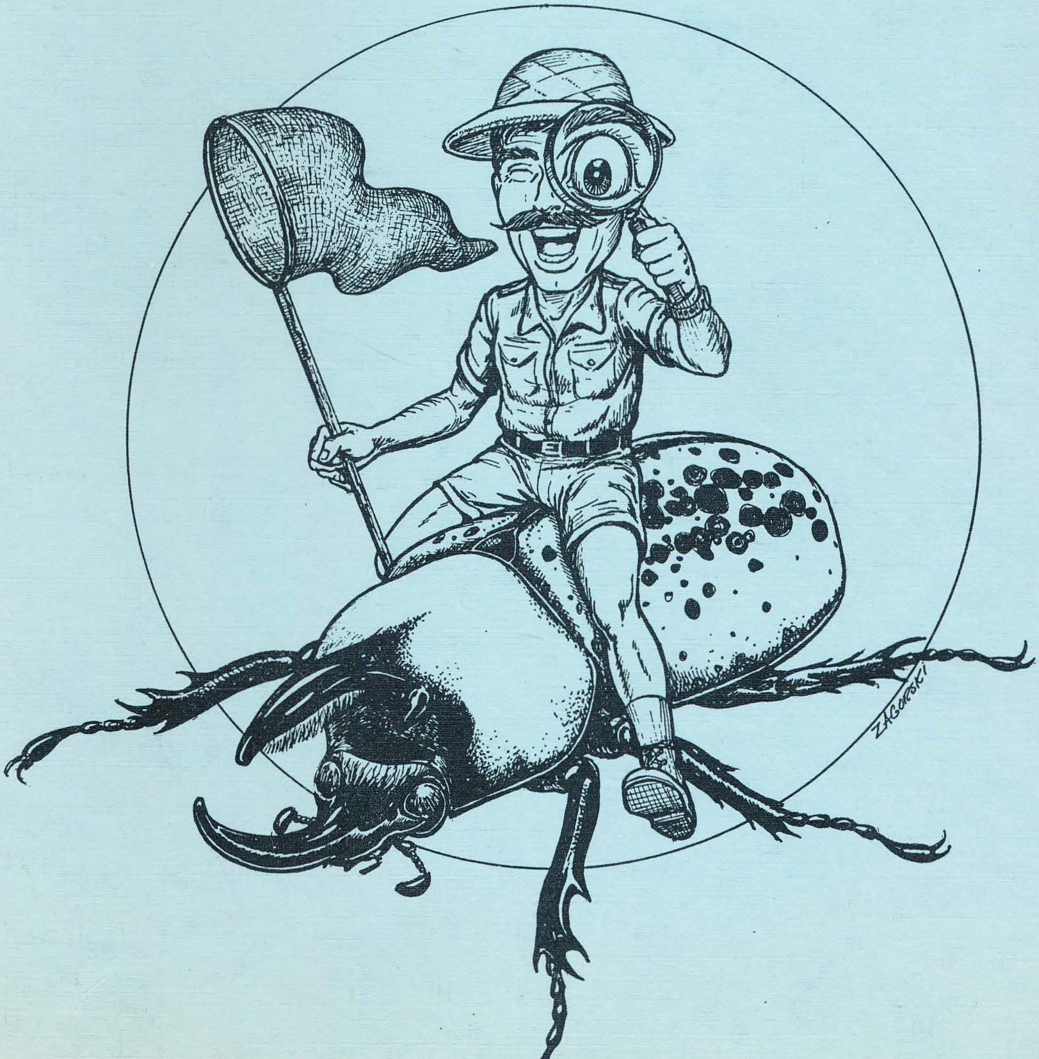

Illustration by Michael Zagorski, Warrenville, IL

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YOUNG ENTOMOLOGIST'S SOCIETY

Y.E.S. QUARTERLY

Vol. 2, No. 4 (1985)

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INFORMATION FOR AUTHORS

Manuscripts and original artwork on any insect or Arthropod-related topic are welcome for publication in Y.E.S. QUARTERLY. Articles with special interest to young entomologists will receive publication priority. Manuscripts may be of any length, but should be double-spaced and typed (or neatly written). Photographs or maps should be done in black and white, and any drawings, charts, or graphs or maps should be done in black ink and should fit in the new page size. All authors should supply a title for their article and a complete mailing address. We're sorry, but no page proofs can be furnished.

Other features, including news, field notes, book reviews or other illustrations, are also accepted and will be used when space is available.

Members may submit short "advertisements" for the "Trading Post" section, describing their special desires for information, correspondence or specimens. All ads will be edited for brevity and acceptability and their inclusion will be made on a space-available basis.

Send to: Young Entomologist's Society, c/o Department of Entomology, Michigan State University, East Lansing, MI 48824-1115 USA.

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Our newest Sustaining Member is Francesco Isgro of Falls Church, Virginia. Welcome Francesco!

REPORT FROM HEADQUARTERS

Promotional Activities

Our new promotional display has made several appearances in the past two months. It was featured at the 4-H Exploration Days "International Bazaar" and Ag Expo '85, both held at Michigan State University. It also made an appearance at the Michigan 4-H Entomology Leaders Workshop held at the Kellogg Biological Station in Hickory Corners, Michigan. Next week I will be traveling to the Florida Entomological Society meeting in Ocho Rios, Jamaica to promote our Society among Caribbean entomologists.

Several members have written to request small supplies of the Y.E.S. promotional brochure/membership application, and I appreciate their willingness to help tell others about the existence of our organization. Keep up the good work!

Membership Report

Last month we carefully checked our mailing list and computer files and found that nearly one hundred members failed to renew their memberships in 1985, for one reason or another. Unpaid members have ben dropped from the mailing list after receiving two issues of our journal on a gratis basis. So, our current active membership stands at about 310 people. Fortunately we did enroll a lot of new members in 1985 but we still came out with a net loss of members. What did we do wrong? Or, what didn't we do right? Let me know if you have any ideas why this is happening.

Speaking of memberships and such, the time to renew your membership for 1986 is fast approaching. I will be mailing renewal forms with the 1986 Member Directory sometime in November. Please support your Society and renew your membership promptly!

Art Editors

We are still taking "applications" from people interested in serving the Society as art editors for Y.E.S. Quarterly. We have several prospective candidates at this time, but I'd like to see more applicants for these important positions. See the summer issue (Vol 2, No. 3, p. ii) for complete details. It's not too late to get involved!

From the Mailbag

Patricia Purdy (303 Elm Street, Salem, VA 24153 USA) writes, "...I have a complaint about the membership directory. Wish you would drop the 'code system.' I find it aggravating to deal with. Instead, wish you would simply arrange names and addressed according to State, Country, etc. KEEP IT SIMPLE FOR EASY REFERENCE!"

(Editor's Note: How do other members feel about the Membership Directory? We were trying to provide a cross-reference system so you could scan the list for members with similar (or different) geographic locations, similar interests, and similar ages and yet not have to list each person and their address three or more times. Your opinions can help us decide how to format the 1986 Directory!)

Bill Clark (6305 Kirkwood Rd., Boise, ID 83709 USA) writes, "I love your idea of the 'Specimen swap boxes.' Hope it works out,"..."I think there is a definite place for your journal (just look at the members that receive it). I'd venture a guess that more people read it than do many of the 'high-powered' ent. journals. Therefore I think your idea of the Field Notes section is also a good one." He continues, "You asked for specific comments on the journal. I offer the following items that would strengthen the journal and make it more usable and available...(1) I would like to see it covered in Biological Abstracts and Current Contents....and (2) I would like to see a reference line...perhaps at the top (of the page)."

(Editor's Note: Thanks for the suggestions Bill. We will be incorporating them in Vol. 3 (1986).)

Back Issues of Y.E.S. Quarterly

We still have a supply of some back issues of our journal. Specifically, we still have copies of Vol. 1, Numbers 2, 3, and 4, and Vol. 2, Numbers 2, 3, and 4. We would be happy to send them out at the special prices of US $.50 per number. If you need extra copies, here's your chance!

Specimen Swap Boxes

The response to our specimen swap box program has been pretty good. A box of specimens and instructions is circulating at this very moment. Everybody has surplus specimens they'd like to trade off and here's your opportunity. There's plenty of room for additional participants. See the summer issue (Vol. 2, No. 3, p. 8) for complete details.

Gary A. Dunn

Gary A. Dunn
Y.E.S. Advisor

SPECIAL FEATURE ARTICLE FOR NEXT ISSUE: "New Hierarchical System of Arthropoda, Mainly Referring to Insects"

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(An Abstract)

Modern research has already demonstrated: (1) present phylum ARTHROPODA is heterogeneous and polyphyltic. author considers it proved enough to recognize its main divisions as phyla: Trilobitomorpha, Chelicerata, Pantopoda, Crustacea, Chilopoda, Pauropoda, Diplopoda, Symphyla, Protura, Collembola, Thysanura, Diplura, Pterygota and Insecta. Consquently, most of their ordr automatically become classes, their subdivisions being analogically promoted as well; (2) striking hetrogeneity of present animal system also originates in high different measures used to classify ARTHROPODA and VERTEBATA creating a taxonomic puzzle (e.g., by attributing to present families of the former order a larger, more diverse ccontent than to orders of the latter). Nature itself claims for radical revision to elimenate such discrepancies, in order to reach an equilibrated natural system. In INSECTA, mainly, promotion of most subdivisions appear as logical.

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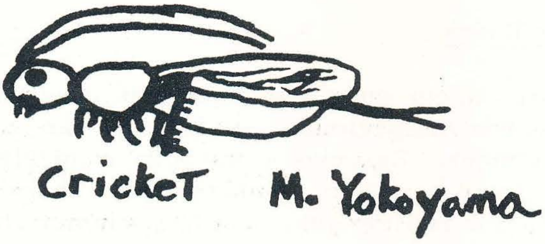

Cricket; drawn by Mark Yokoyama (age 10); Corvallis, OR

GOLDEN OPPORTUNITIES FROM GOLDENRODS

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One of the surest signs of fall in the eastern U.S. is the bloom of goldenrod flowers. When the first species blooms (early goldenrod or Solidago juncea), even though it may be mid-July, I always feel a pang of regret that the summer is passing so quickly. By August, old fields and roadsides are carpeted in feathery yellow inflorescences. There are over 60 species of goldenrod in the eastern United States, and they are not easy to distinguish, although many species can be separated on the basis of inflorescence shape (plume-like, elm-branched, club-like, wandlike, and flat-topped), leaf shape and veination (parallel or feather veined), and habitat (bogs, moist woods, pine barrens, swamps). The Peterson field guide to wildflowers of the Eastern United States is helpful if you are interested in trying to identify species. My favorites are the goldenrods of old fields, notably S. canadensis, S. juncea, S. graminifolia, and several others, because these harbingers of autumn are a great place to look for insects.

Next time that you pass a goldenrod in bloom, look closely. Notice that it is composed of numerous, closely packed flower clusters that look like tiny daisies. Each cluster is itself composed of tiny florets, each with its own pistil and anthers, the male and female parts of a flower. Other members of the aster family have similar tiny florets making up an inflorescence, but it may be shaped very differently than that of goldenrods. The disk of a daisy flower, for example, is made up of numerous florets like those of goldenrods.

By the way, if you are reluctant to get close to a goldenrod flower for fear its pollen will aggravate your fall allergies, you needn't worry. The pollens that cause allergies are light and dry, and are carried by the wind. Goldenrod pollen is heavy and sticky by comparison, and requires an insect to transport it from flower to flower. Fall allergies, which many people attribute to goldenrods, are really caused by pollen of ragweed, which blooms at the same time as goldenrod. Ragweed has a stalk of inconspicuous green flowers that many people wouldn't recognize as an inflorescence. Because it is wind-pollinated, ragweed flowers don't have to be showy and bright like goldenrod flowers to attract insects.

Pollen of the goldenrod florets, along with nectar, attracts numerous beetles, bees, wasps, and flies. Queen and male bumblebees and the social wasps may come to goldenrod flowers for nectar to build up their fat reserves for the winter; honeybees come to fill their honey cells for the winter. Numerous beetles, such as the elongate, yellow and black soldier beetles (Cantharidae), shiny black blister beetles (Meloidae), fireflies (Lampyridae), and long-horned beetles (Cerambycidae), can be found at the flowers, along with hover-flies (Syrphidae) and bee flies (Bombyliidae), taking nectar and pollen to mature their eggs.

Watch carefully and you may find one of several species of bees that are specialists on goldenrod and aster flowers, i.e., they forage for pollen only from a small group of related flowers. Perdita octomaculata (Hymenoptera: Andrenidae) is a small (1/3 inch), narrow, black, wasp-like bee with 8 yellow markings (maculae) on its abdomen. This species mates on goldenrod flowers, and if you look, you may see a female crawling around the flowers trying to drink nectar, dragging a male around on her back. There are several other small, gray to brown specialist bees of the genus Andrena (Hymenoptera: Andrenidae) on goldenrod.

If you see a bee that seems to be interested only in goldenrod, try following it around from plant to plant, and describe how it moves on the flowers, where it stores pollen on its body, whether it occasionally sticks out its tongue to drink nectar while gathering pollen. How does the behavior of these small bees compare with the behavior of goldenrod flower visitors that are more generalized in their food preferences, such as honeybees, bumblebees, and some of the beetles and wasps on flowers?

Studies of the nectar content of flowers indicate that each floret of the goldenrod inflorescence has a very small amount of nectar compared with most other flowers. Such a small nectar reward is not sufficient to attract large, hovering pollinators, such as hummingbirds or hawkmoths which need a great deal of nectar to satisfy their high energy requirements. However, insects that land on the goldenrod inflorescence can gain enough energy despite the minute amounts per floret, because walking from one flower to another takes about 100 times less energy than flying. Furthermore, on goldenrod many florets can be visited in rapid succession with a minimum of movement. Thus, a foraging bumblebee will spend most of its time crawling around a goldenrod inflorescence, but may fly between flowers on an inflorescence like that of Delphinium, in which each flower has plenty of nectar to meet the high energy requirements of flight (1).

A simple experiment involving nectar supplementation will demonstrate the importance of nectar quantity in bee foraging behavior. You will need a stop watch to time the bees' activity. Start by characterizing a bee's foraging behavior on several normal, control inflorescences. Record the time that the bee spends sucking nectar out of florets, the time spent walking between florets, and the total time spent on the inflorescence. Record also the time spent flying between inflorescences. Use a ruler to measure the lengths of the plumes or branches of the inflorescence that the bee walks while on the inflorescence, and record this, too.

Next, make up a solution of artificial nectar by mixing a cup of warm water with 3 tbsp. of sugar. With an eyedropper, put from one to six drops of nectar on a goldenrod inflorescence. Now wait for bees to arrive on the flowers. Record the same variables for the same species of bees on these inflorescences. Has the bee changed in the proportion of time spent standing still, walking on the inflorescence, and flying between plants? Is there a change in the proportion of the inflorescence branches over which the bee walks? How do you suppose this affects pollination of the goldenrod plants, assuming that florets on one plant require pollen from another plant?

While you were observing the flower visitors of goldenrod, did you notice that not all of them take nectar everywhere on the goldenrod inflorescence? Particularly on goldenrods with plume-like or elm-branched inflorescences, the largest visitors may be restricted to florets that are close to the central stalk of the plant, where there is more support for their large bodies. Look for large bumblebee species, particularly large queens, and watch where on the inflorescence they forage. What about small bumblebee workers, or other small flower visitors? They are light enough to crawl around the florets at the end of branches, far from the stem. Do they also forage from florets near the stem like the large bumblebees? In one study, small bumblebees foraged from outer florets but not from the inner florets when large bumblebees were present. In this way the flower resources were partitioned between different species of bumblebees. However, when a cage was built around the goldenrod, and only the small bumblebees were allowed to forage in it, they quickly sensed that their larger competitors were not present, and expanded their foraging to include the inner florets (2).

In addition to the flower feeding visitors of goldenrod, you may also see some predators lurking around the inflorescences. The crab spider, Misumena vatai (Clerck), takes on the color of the flower that it sits on over a period of several days. It is either white or yellow, with a light red band on either side of the abdomen. You may be able to observe the color change yourself by trying this experiment. Collect some yellow crab spiders on goldenrod and mark them on their underside with a dab of Testor's enamel paint, or nail polish. This marking will hopefully remain on the spider for several days so you can find it again. Put half of the spiders back on goldenrod, marking the plant stalk with tape or ribbon. Put the other half of the spiders on white flowers such as ox-eye daisies, also marking the flower stalk. After a couple of days, see if you can find the spiders again on or near the plant where you placed them. Hopefully, the spiders on the white flowers will have changed color to match their new background.

Do you suppose that the spider takes on the color of its background so its prey doesn't see it lying in wait? You're probably wrong. Insects can see ultraviolet light and the flowers on which spiders sit often reflect UV light. The spider's body however, absorbs UV, and would appear dark against the UV reflecting flower petals. The changing spider colors more likely protect the spider from predation by birds, which do not see UV light. To their eyes, as to ours, a yellow spider on a yellow flower would be camouflaged.

When you've observed and collected as many flower visitors to goldenrod as you like, consider the insects that are attracted to other parts of the plant. You may find larvae of beetles in the genus Trihabda, a skeletonizing leaf beetle in the subfamily Galerucinae of the Chrysomelidae, feeding on the leaves. Related members of the same subfamily of beetles include some important pest species such as the striped cucumber beetle, the spotted cucumber beetle or southern corn rootworm, the northern corn rootworm, and the elm leaf beetle. The adults of the genus Trihabda are 5-12 mm and have one median and two lateral stripes on their elytra (front wings). The larvae can be very destructive to goldenrod plants, and by killing them, may allow the dominant plants in an old field to change from goldenrod to other species (3). Larvae first appear in early May and begin to feed on immature goldenrod leaves. Adults first appear in late June or early July. In upstate New York, 9 species of specialist chrysomelids including several species of Trihabda, and 4 species of generalist chrysomelids were associated with goldenrods in one study (4). How many species can you find on goldenrod?

Some goldenrod plants may also harbor aggregations of sap-feeding treehoppers (Homoptera: Membracidae) such as Publilia concava. These aggregations may be tended by one of several species of ants. The ants and treehoppers have a mutualistic (mutually beneficial) relationship. The ants protect the treehoppers from predation, while the treehoppers provide the ants with sweet secretions of plant sap, called honeydew. Although the membracids harm the plant, they don't do as much damage as Trihabda larvae. In fact, with ants present to tend the treehoppers, the goldenrod plant actually benefits, because the ants keep leaf beetles off of the plant, thus preventing defoliation (5).

If you find a field of goldenrod where ants are tending treehoppers, you may be able to demonstrate the effects of the ant-treehopper mutualism yourself. Try introducing various caterpillars or beetle larvae and adults that you collect from goldenrod plants without treehoppers, or from other plant species. Do the ants attack or remove these larvae? Alternatively, remove the ants and ring the base of the goldenrod stalk with a wide piece of electric tape, sticky side out, or with tanglefoot, a sticky substance sold at nurseries. Be sure that the plant does not touch anything that would allow access to a crawling insect without going over the sticky substance. This will keep the ants from tending the treehoppers. After a few days without protection, the treehoppers may be parasitized or eaten by predators. Other herbivorous insects such as Trihabda may appear on the plant as well.

Many other plant feeding species can be found on goldenrod. For example, 23 species of myrids (Hemiptera) in 16 genera were associated with goldenrods in upstate New York. Most of these were in 6 genera: Lygus, Slaterocoris, Lopidae, Plageognathus, Adelphocoris, and Pollymerus. These can be divided into two groups: flower feeders and foliage feeders. Tarnished plant bug, Lygus lineolaris, was the most common species, especially from mid-August until late September (6). How many different types of myrids do you find on goldenrods? If you look for them once a week for several weeks, do you see changes in the species that are most abundant on the plant?

Finally, you will probably notice that goldenrods develop a number of types of galls. The goldenrod gall moth in the genus Gnorimoschema (Lepidoptera: Gelechiidae) causes the plant to form elliptical or spindle-shaped galls. The goldenrod gall fly, in the genus Eurosta (Diptera: Tephritidae) causes the plant to form a round ball or ball gall. Finally, gall midges in the genus Rhopalomyia (Diptera: Cecidomyiidae) cause the plant to form a rosette or bunch gall, which is the rarest type of gall.

The goldenrod gall moth is a relative of the pink bollworm, a pest of cotton. The gall moth lays its eggs on goldenrod leaves and stems in the fall. During the winter the plant dies back, so the eggs spend the winter in the litter under the snow. In the spring, the eggs hatch and the larvae search for a young goldenrod shoot. When a larva finds a goldenrod plant, it crawls up the stem to the apical bud and tunnels in 1 to 2 inches. The plant responds to chemicals produced by the larva by enlarging the stem into a gall, which contains plant material on which the larva feeds. Before pupating, the larva cuts most of the way through the upper end of the gall wall. Pupation takes place inside the gall. In early September the adult emerges, and pushes out the hole that the larva began. Adults mate, females lay eggs, and the cycle begins again (7, 8, 9). If you collect galls from green goldenrod plants before the exit hole appears in the Fall, you may be able to watch the adult emerge.

The goldenrod gall fly is a relative of the apple maggot and the infamous Mediterranean fruit fly. Its life cycle is very different from that of the gall moth. Adults emerge in May to June from last year's galls. The adult lives for only 9 to 11 days. The female oviposits in the terminal bud of the young goldenrod plant. After 7 to 12 days, the egg hatches and the larva bores into the stem. Chemicals from the larva cause the plant to form a sphere of plant tissue around the larva. The ball gall has a thicker wall than does the spindle gall of the gall moth. The fly larva lives and feeds in the center of the gall. In the fall, the the larva cuts a tunnel to the surface of the gall, and then returns to the center to overwinter as a larva. Pupation and emergence take place the next spring. The adult fly is striking. Its' thorax has two black longitudinal stripes and several other black markings on the sides of its small, rotund body. Wing have dark, zig-zag patches (10, 11).

The bunch gall is the goldenrod's response to larvae of the gall midge. These tiny orange larvae move from the soil in March and April to the young goldenrod plant. The gall begins to form in May. At this time the gall is a sphere with a pointed apex, resting in a base of close leaf whorls. The sphere starts out green, but becomes brown as it ages. When mature in September, it splits into 3 to 8 locules, each with its own gall midge larva inside. They pupate in the locules in mid-August. Adults emerge in September, and oviposit behind old leaf sheaths on the lower stem, as well as in the rhizomes on the ground. The adult stage lasts only a few days. It is unclear whether overwintering is done as eggs or first larval instars or both (12).

Numerous parasites attack these gall-makers. The gall fly larvae is attacked by parasitic Hymenoptera (Eurytoma, a seed chalcid in the family Eurytomidae) and a predatory beetle, Mordellistena unicolor (Mordellidae, a tumbling flower beetle) (10). The moth is attacked by hymenopteran parasites in the families Chalcidoidea, Eurytomidae, Ichneumonidae, and Brachonidae. Predation by birds accounts for about 20% of gall fly mortality. Downy woodpeckers peck a large hole into the ball gall and feed on the fly larva inside. If there is a Eurytoma parasite larvae also in the gall, the woodpecker ignores it (13).

Try collecting galls from this year's goldenrod plants and determine what proportion are parasitized. Gall moths in the spindle galls and gall midges in bunch galls will emerge for you this fall, and you can see what the adults look like right away. Gall flies in the ball galls won't emerge until spring, but you could open them and see what the larva inside looks like. Alternatively, leave ball galls in a cold dry place to overwinter, or put them in the refridgerator for two months or so. See if you have successfully reared the gall fly or its parasite through the winter by watching for emergence after the gall warms up.

In a series of interesting studies, it was shown that goldenrod galls decrease the weight of the plant's rhizome (root system) and the number of flowers and seeds produced on the plant. However, parasitized galls did less damage to the plant than did unparasitized galls, because less of the plant's resources were used to make the gall. Thus, the gall parasite had a beneficial effect on the plant (14).

As you can see, much interesting entomology takes place on a simple autumn weed. Perhaps you'll see goldenrods differently when they bloom this fall.

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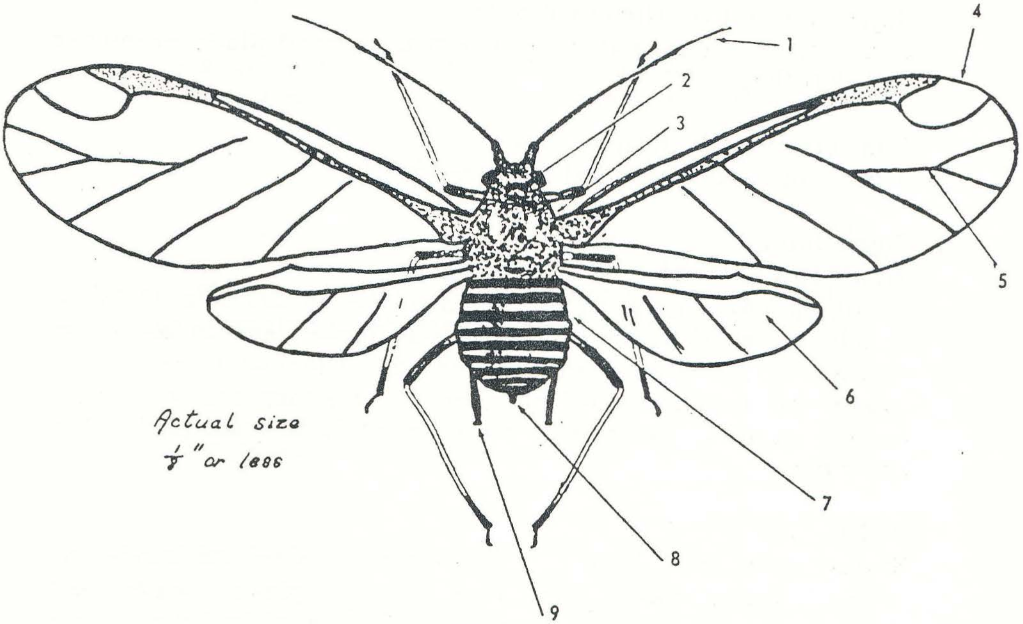
NAME THE PARTS

Can you name the numbered body parts in this illustration of an aphid? A list of parts is given below to assist you in this challenge. The answers are found elsewhere in this journal.



Actual size
$\frac{1}{8}$" or less

____ abdomen
____ antenna
____ cauda
____ cornicle
____ forewing
____ head
____ hindwing
____ thorax
____ wing veins

GALL WASPS IN A SCIENCE FAIR

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USA

This year I entered a Science Fair with a project about gall wasps. I used the scientific method to design my project which was an experiment carried out from August 1984 to February 1985.

I would like to tell you about my experiment using the scientific method as an outline.

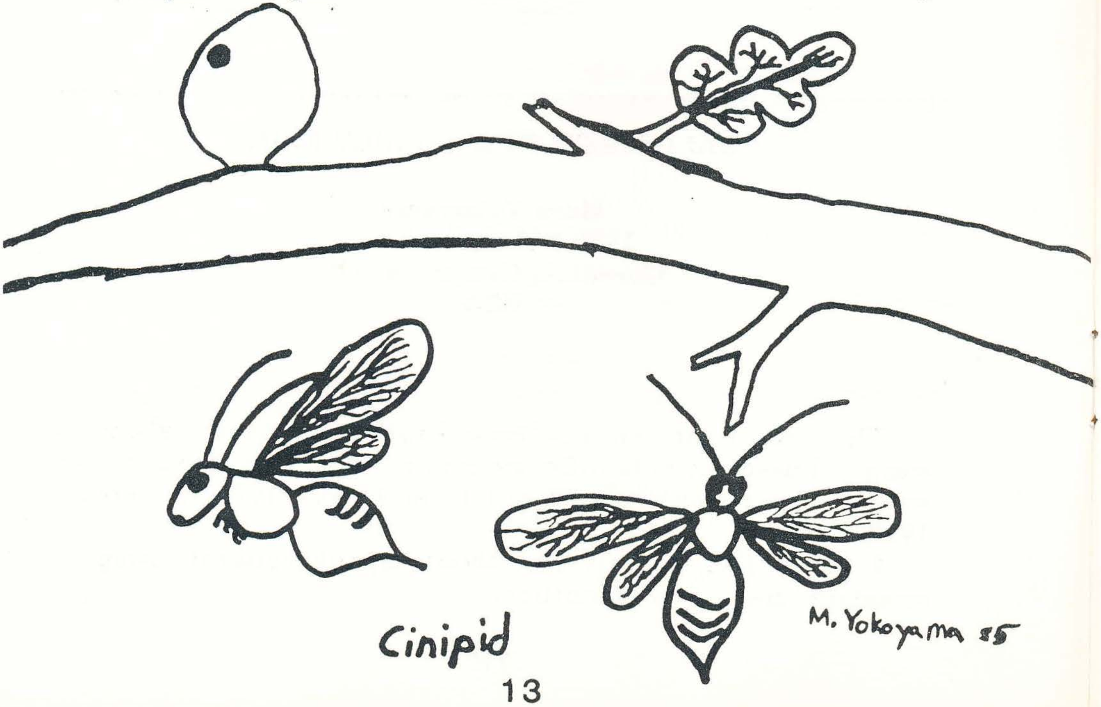
1. Identify Problem
   Do different environmental conditions affect the hatching of gall wasps?

2. Formulate Hypothesis
   Experiment #1: Speckled galls
   Living in a warm, but not too warm, lighted place promotes gall hatching.

   Experiment #2: Bullet galls
   Galls kept warm will hatch sooner.

3. Experiment
   EXPERIMENT #1
   Some speckled galls were placed in jars in the closet (dark), inside my room (warm), and outside (cold), and in my room by the heater (very warm). Every day I looked to see if any wasps had hatched and I checked the morning and afternoon temperatures. The results were negative in each place. No hatchings.

   EXPERIMENT #2
   Bullet galls from Tree 1 were placed outside and inside my room. Bullet galls from Tree 4 were placed inside and outside. A bullet gall from Tree 2 was placed inside my room. I checked the morning and afternoon temperatures daily and also observed the jars daily for wasps. The results were interesting. The galls placed outside hatched nothing. Two of the tree galls placed in my room did hatch gall wasps. The gall from Tree 1 that was inside hatched 4 gall



wasps. The gall from Tree 4 that was inside hatched 5 gall wasps. I put the wasps in alcohol and took them to Oregon State University where Dr. Jeff Miller identified them for me.

I tried to control the variables by collecting the galls from the same kind of oak, the exact same tree in some cases, at the same time of year, from the same area of Corvallis, and each experiment used only one kind of gall.

4. Observe and Record
I observed A.M. and P.M., took temperatures outside A.M. and P.M., recorded the temperatures, observed the gall wasps hatching and recorded the date, time and from which jar.

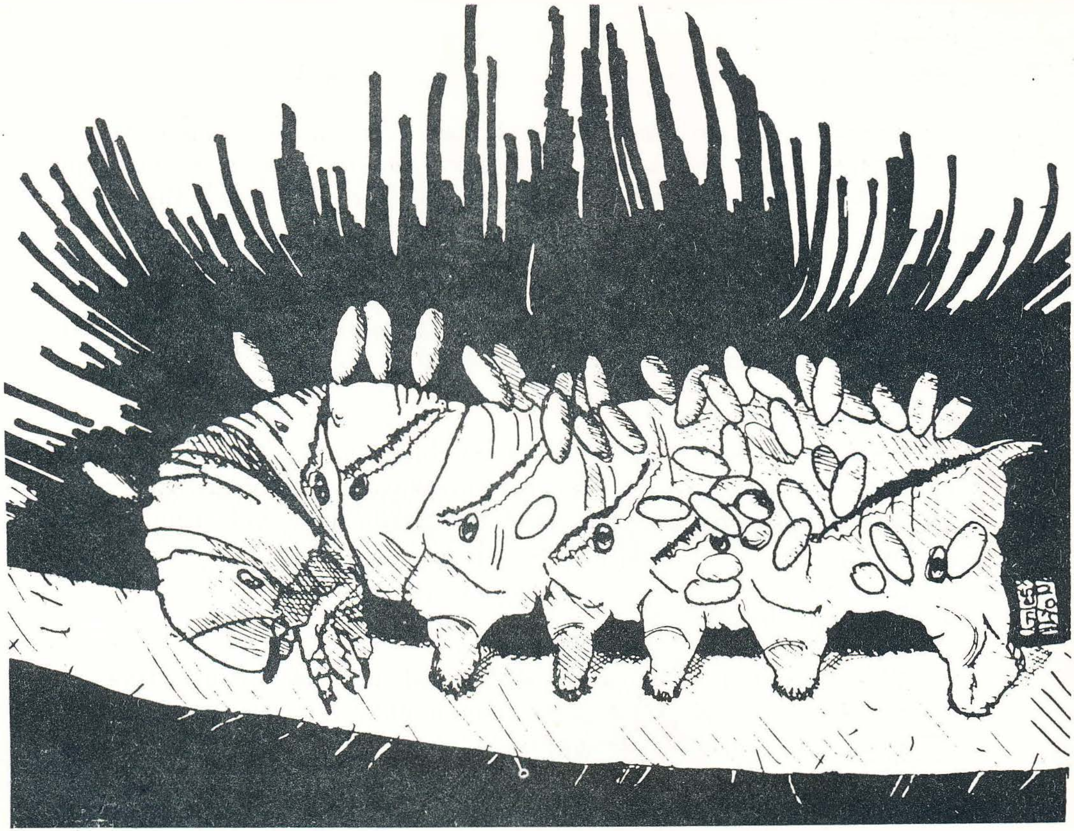
5. Draw a Conclusion
EXPERIMENT #1 Speckled galls
The speckled galls were collected at the wrong time or place or the speckled galls have a very low survival rate or they were attacked by parasites.

EXPERIMENT #2 Bullet galls
A warm environment promotes gall hatching, and fools the wasps into thinking it's spring. Outside parasites may have invaded galls.

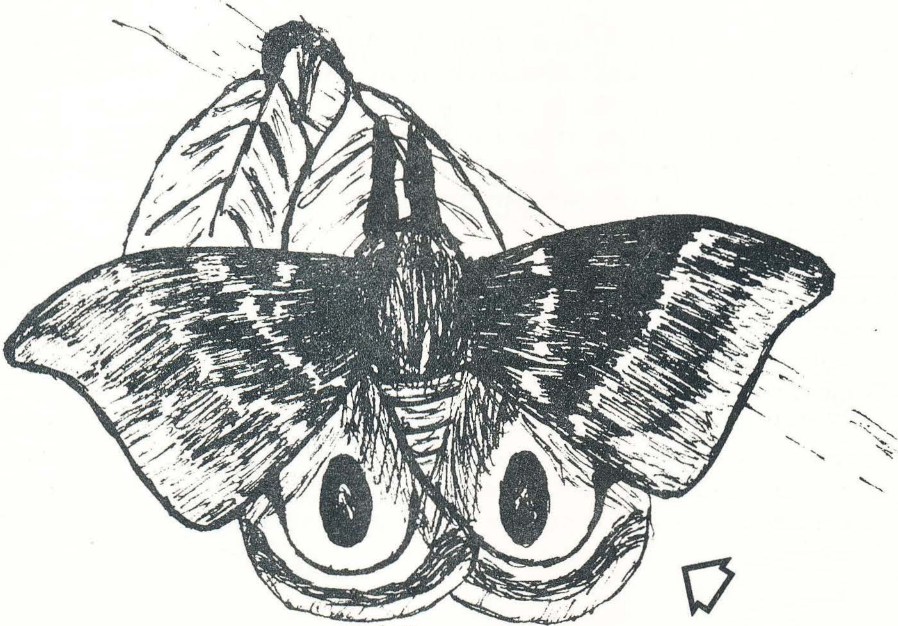
The day of the Science Fair, I set up my display which was a wood plaque showing various types of galls, all my experimental galls in fruit jars with a net top covering, and all the gall wasps that had hatched in vials of alcohol. The judges finally got around to interviewing me. They asked me a lot of questions about the results of my experiment. Then they went on to the other exhibitors.

Later on in the day, the awards were given out. I waited anxiously to hear my name called. The judges began by awarding the fourth place ribbons. Finally only one other student and I were left. I won first place! The prize was a telescope!

I felt very proud of my project and felt good about having learned so much. The Science Fair was a lot of fun because there are many different and interesting projects to look at and learn about. Insect topics are very good ones for Science Fairs. I hope you will enter one, too!



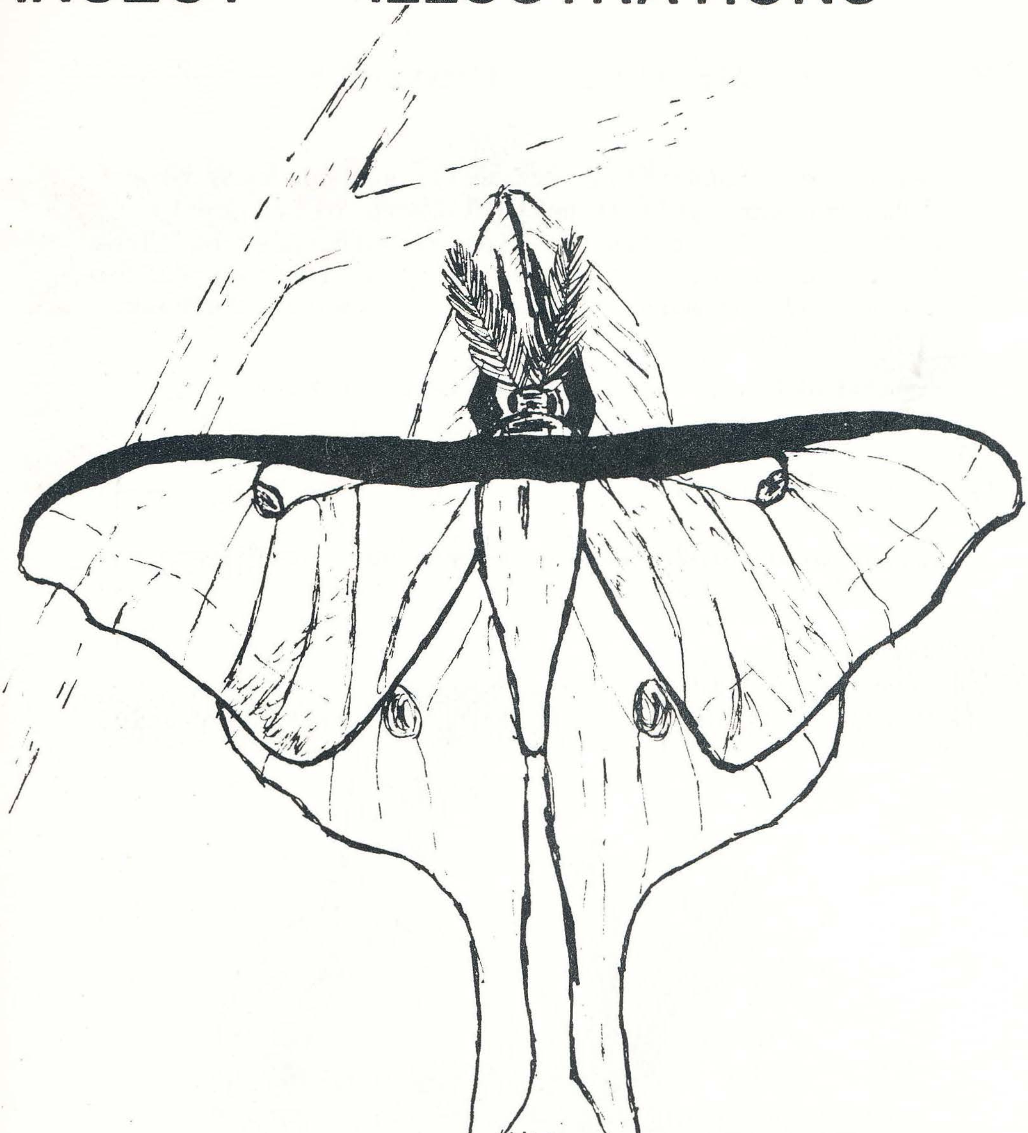
Parasitized hornworm, drawn by Giles Lyon, Hillsdale, NJ



Lisa Resotko 7/85

Io moth, drawn by Lisa Res
Towaco, NJ

INSECT ILLUSTRATIONS



⇧ *Luna moth, drawn by Lisa Resotko, Towaco, NJ*

REARRANGE A BUTTERFLY ?

Rearrange a butterfly? Actually, see how many other words you can spell from the letters in the word BUTTERFLY. The rules are simple: words must be three letters or more. Can you think of at least 26 different words? Or more? Answers are found in the back of this issue.

Submitted by Suzanne Kekich, Winter Park, FL

Red-spotted purple butterfly, drawn by Lisa Resotko, Towaco, NJ

MIGRATION OF EUNICA TATILA (LEPIDOTERA: NYMPHALIDAE)

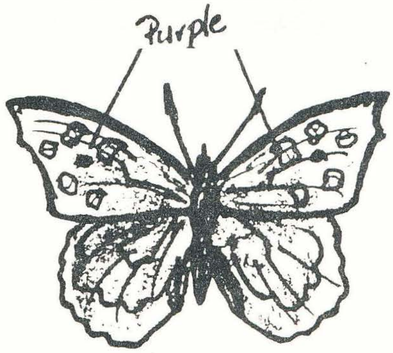
Luis R. Perez
HC 02, Box 18881
San Sebastian, PR 00755
USA

I have been collecting butterflies for about six years. During the past three summers I have observed that Eunica tatila (Herrich-Schaeffer) flies in my zone in Puerto Rico by the hundreds and that these groups fly to the west. The first time I was this was in 1983 and it was a great experience and surprise. Then in June 1984 the same thing happened, the butterflies again flew in the same direction in groups of hundreds of individuals. These, of course, are the descendents of last year's migrants.

Since I knew these butterflies should visit in June, I watched for their expected arrival this year. On June 12, 13, and 14, I began to see the first butterflies and on June 15 through 20, the butterflies were everywhere.

The best season for butterfly collecting is usually the summer. Puerto Rico is a tropical island and here we have butterflies during the entire year, but I have observed that Eunica tatila only appears in June and July. I am sure that I am observing a migration because during the day the adults rest on any plant or tree for only a minute or so and then continue on their trip. At night they rest under leaves of sugarcane until morning.

If any other person has observed this migration, please write to me, because I would like to study this phenomenon further.



Eunica tatila

THE LIFE OF THE INSECT
DUNG BEETLE

Joan Scancarelli
80 Van Buren Street
Massapequa Park, N.Y. 11762
USA

Female Beetle: "Oh, what a lovely little pile,
what a treasure, what a beautiful little ball,
What a precious little future."

Male Beetle: "It's our only joy. To think how we've saved and scraped, toiled and moiled, denied ourselves, gone without this, stinted ourselves that--"

Female Beetle: "And worked our legs off and drudged and plodded to get it together and--"

Male Beetle: "And saw it grow."

A POEM

Some insects are mathematicians.
They can add to your misery.
Subtract from your pleasure.
Divide your attention and
Multiply like crazy.

A WATERSCOPE FOR VIEWING AQUATIC INSECTS

Gary A. Dunn
Dept. of Entomology
Michigan State University
East Lansing, MI 48824-1115
USA

There is a great deal of activity beneath the surface of ponds, lakes and slow-moving streams, but it takes a simple device like a waterscope to observe this activity. You can make your own waterscope in a few minutes using materials available around the home.

You will need the following materials: (1) half-gallon size mile carton (or similar container), (2) a plastic bag, cellophane or other piece of clear plastic big enough to cover the end of the chosen container, (3) a pair of scissors, and (4) 2 or 3 rubber bands.

Assemble the waterscope in the following manner: (1) Cut off the top and bottom of the milk carton. Keep the "tube" as long as possible; (2) put the plastic over one end of the carton and smooth it down over the sides; (3) put the rubber bands over the plastic and around the carton to keep the plastic in place. Your waterscope is now ready for use!

Now you can test your waterscope at your favorite local aquatic habitat. To use the scope, place the plastic covered end into the water and look through the open end. The plastic acts as a lens and allows you to see through the reflective surface of the water. You might want to keep field notes on any insect (or other animal) activity you observe.

(Adapted from "What's Under the Water?", Timberlines, June 1985).

INSECT ORDER WORD FIND

Can you find the 23 insect order names hidden below? The words may be forward or backward, and may be horizontal, vertical or diagonal. Some words may share letters, but no words are contained within other words. Happy hunting!

Lepidoptera
Odonata
Collembola
Ephemerida
Strepsiptera
Diptera
Thysanura
Mallophaga
Plecoptera
Neuroptera
Siphonaptera
Orthoptera
Coleoptera
Anoplura
Embioptera
Protura
Hemiptera
Diplura
Thysanoptera
Homoptera
Trichoptera
Mecoptera

L A R E T P O C E M B H E M I P T E R A
N E P H E M E R I D A C K Y S D X P K O
E O P N X U S H E R P L E C O P T E R A
U S Z I U R E L A R E T P O C I R T Z S
R M Q B D C L C A N O P L P D C H E F T
O T A P I O I R V Z D E D R F O S U T R
P A F L P L P G L B O A N O P L U R A E
T R Y O L E S T O X N V L T V L X O R P
E E U G U O W U E J A F E U G E F M U S
R T V L R P P V Q R T R Z R B M S A N I
A P K A A T I H A K A O W A O B T O A P
Y O B Z K E Q R A R E T P O M O H P S T
D I P T E R A J T G S F I X R L G W Y E
O B U M N A N Y U R A N E P D A E O H R
Q M P Z H T U A R E T P O N A S Y H T A
A E V S I P H O N A P T E R A Q C I M D

Submitted by: Gary A. Dunn

FIELD NOTES

This section is set aside for the publication of field notes and collecting results as a service to the entomological community. Send your field notes, however long or short, to: Gary A. Dunn, Department of Entomology, Michigan State University, East Lansing, MI 48824-1115 USA. See Y.E.S. QUARTERLY 2(3):16-17 for futher information.

LOCALITY: USA, Mississippi, Hancock Co., near Pearlington.
DATE: 16 April 1985.
COLLECTOR: Gary A. Dunn (Dept. of Entomology, Michigan State University, E. Lansing, MI 48824-1115 USA).
CONDITIONS: hot and sunny, 80 F
SPECIMENS: Carabidae- Ega sallei Chev. (13) and Ardistomis viridis (Say) (10)

LOCALITY: USA, Louisiana, Jefferson Parish, Grand Isle State Park
DATE: 16 April 1985
COLLECTORS: Gary A. and Kristi L. Dunn (Dept. of Entomology, Michigan State University, E. Lansing, MI 48824-1115 USA).
CONDITIONS: warm and humid, 75 F; collecting at lights and propane lantern
SPECIMENS: Carabidae- Notobia terminata (Say) (2), Clivina bipustulata Fabr. (1) and Panageus cruciger (1).

LOCALITY: USA, Louisiana, St. Charles Parish, near St. Rose on the Mississippi River.
DATE: 17 April 1985
COLLECTOR: Gary A. Dunn (Department of Entomology, Michigan State University, E. Lansing, MI 48824-1115 USA)
CONDITIONS: sunny and hot, 90 F; splashing along banks of the river
SPECIMENS: Carabidae- Ardistomis viridis (Say) (1) and Stenolophus comma Fabr. (1).

LOCALITY: USA, Texas, Stephens Co., Stephens Co. airport

DATES: 23-26 May 1985

COLLECTOR: Gary A. Dunn, (Dept. of Entomology, Michigan State University, E. Lansing, MI 48824-1115 USA)

CONDITIONS: warm and breezy, 65 to 90 F; collecting in afternoon, and at lights at night

SPECIMENS: Carabidae- *Dromochorus pilatei* Guerin (1), *Calosoma scrutator* Fabr. (1), *C. macrum* LeConte (18), *C. affine* Chaudoir (9), *C. marginalis* Casey (33), *Cratacanthus dubius* Beauvois (1), *Pseudamphasia sericea* (Harris) (1), *Agonum punctforme* Say (1), and *A. pallipes* Fabr. (1).

LOCALITY: USA, Texas, Palo Pinto Co., 3 miles W. of Mineral Wells

DATE: 26 May 1985

COLLECTOR: Gary A. Dunn (Dept. of Entomology, Mich. State University, E. Lansing, MI 48824-1115 USA)

CONDITIONS: warm and humid, 70 F; collecting at lights (motel).

SPECIMENS: Carabidae- *Calosoma scrutator* Fabr. (5), *C. macrum* LeC. (14), *C. marginalis* Casey (9), *Stenomorphus californicus* Menetries (3), *Cratacanthus dubius* Beauv (19), *Euryderus grossus* Say (1), *Notiobia terminata* (Say) (2), *Calathus opaculus* LeC. (4), *Cicindela punctulata* Oliv. (1), *Agonum punctiforme* Say (15) and *A. pallipes* Fabr. (7).

LOCALITY: USA, Michigan, Osceola Co., near Reed City

DATE: 15-19 May 1985

COLLECTOR: Gary A. Dunn (Dept. of Entomology, Michigan State University, E. Lansing, MI 48824-1115 USA)

CONDITIONS: collected by barrier pitfall trap

SPECIMENS: Carabidae- *Scaphinotus bilobus* Say (1- first County record), and *Pterostichus pensylvanicus* LeConte (7). Also collected one *Cicindela sexguttata* with a net.

LOCALITY: USA, Michigan, Osceola co., near Reed City
DATES: 28 May to 7 June 1985
COLLECTOR: Gary A. Dunn (Dept. of Entomology, Michigan State University, E. Lansing, MI 48824-1115 USA).
CONDITIONS: collected with barrier pitfall trap
SPECIMENS: Carabidae- Sphaeroderus lecontei Dejean (1)
Pterostichus pensylvanicus LeC. (8).

……

"SHE'S ALWAYS BRAGGING!"

ADDITIONS TO THE 1984/1985 MEMBER DIRECTORY

I. Changes of Address

32-PQ-4 Claude Chantal
883 Des Erables
B.P. 2072
St.-Nicholas Est, Quebec
GOS 3L0, CANADA

II. Revised Directory Listings

387-ON-1 Brendon Larson
RR 2
Harrow, Ontario
NOR 1GO, CANANDA

Studies Lepidoptera: Sphingidae, Catocala, Saturniidae and most N. Amer. Lepidoptera; Odonata; Orthoptera: Mantidae, Phasmatidae; would like to learn about systematics of Coleoptera & Hesperioidea. Will correspond & exchange.

282-VA-1 Brian Belay
Rt. 1, Box 291
Pearisburg, VA 24134 USA

Coleoptera: Scarab; Cicindelid: Selphid; Staphylinind: Lucanid: Passalid: Buprestid: Elaterid: & Cerambycid: Orthoptera: cockroaches; Lepidoptera: Sphigid: Saturniid: & Ceratocampid:

161-VA-3 Patricia Purdy
303 Elm Street
Salem, VA 24153 USA

Flowering plants of VA & the insets, spiders, & hummingbirds that visit their blossoms; gardens to attract butterflies & hummingbirds; general collecting of local insect or E. U.S. Will correspond & exchange.

III. New Members

360-IL-3 Michael Zagorski
3S 401 Chestnut Ct.
Warrenville, IL 60555

Insect illustration, collecting most Orders. Will correspond, exchange and make determinations.

397-CT-3 Isabel Gordon
58 S. Turkey Hill
Green's Farm, CT 06436 USA

Interested in rearing & conservation of silk moths, luna moths & honeybees.

399-CA-1 Charles G. Nickles
2449 W. Silver Lk. Dr.
Los Angeles, CA 90039 USA

Interested in learning about all aspects of entomology.

400-NJ-1 Kathleen Murray
393 Chestnut St.
Nutley, NJ 07110 USA

Interested in learing about good & harmful insects.

402-NY-1 Cindy Sutherland
Furman's Mill Rd.
Sherburne, NY 13460 USA

Interested in blacklighting, rearing Lepidoptera, & insect physiology.

403-IL-1 Chris Blair
23 Surrey Ln.
Decatur, IL 62526 USA

Interested in Coleoptera; Lepidoptera; started as a 4-H collector.

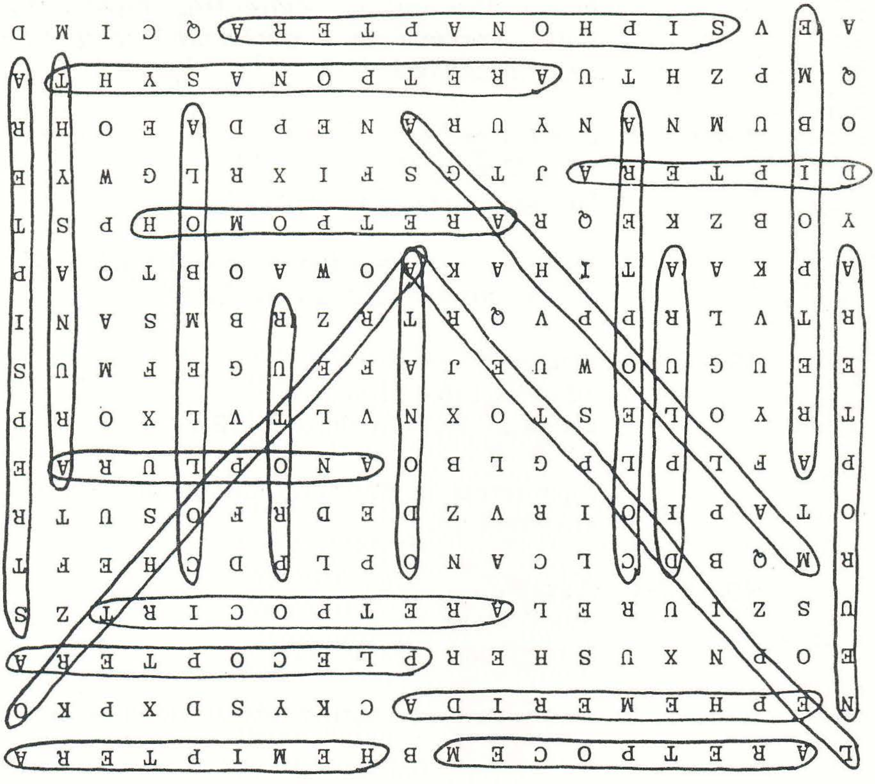
404-NY-2 Michael Valenti
135 Jamesville Ave.
Syracuse, NY 13210 USA

Interested in forest pest insects; Cicindelidae, Buprestidae & Cerambycidae.

Puzzle Solutions

☞ Turn upside down to read the solutions!

Insect Order Word Find:



Rearrange a Butterfly:

1. butter
2. fly
3. fury
4. but
5. bely
6. rely
7. rule
8. burly
9. truly
10. brute
11. fuel
12. tuft
13. flyer
14. buttery
15. butte
16. bury
17. butler
18. blue
19. rutty
20. left
21. blur
22. let
23. beryl
24. burley
25. belfry
26. true

TRADINGPOST

FOR EXCHANGE: copies of papers on the Carabidae (Coleoptera), including: Ball and Nimmo 1983, Progaleritina; Kryzhanovskiy-Palaeartic Omophron; Allen, R. T. 1968, Morionini; Darlington, P. J. 1953, Bahama carabids; Brouerius van Nidek 1978, Mexican Cicindelinae; Erwin and Kavanaugh 1981, Bembidion; Bousqut, Y. 1983, Stomis; Goulet and Bousquet 1983, new Pterostichus; Moore, B. P. 1980, New Zealand Anillini; Casey, T. L. 1913, Memoirs on Coleoptera; Nagel, P. 1982, Cameroon Paussinae; Hayward 1908, Amara; Loveai, G. 1984, Hungarian maize field carabids; and, Loreau, M. 1983, Abax ater alimentary region. Will trade for other literature or specimens of Carabidae and Cicindelidae. Send inquiries to: Gary A. Dunn, Department of Entomology, Michigan State University, East Lansing, MI 48824-1115 USA. (2/4)

FOR SALE OR EXCHANGE: All orders of insects from Israel, especially Diptera and Heiptera. Write for details. Izhak Nussbaum, Nahalat zvi 35, Petack-Tikva 49421, ISRAEL. (2/4)

FOR SALE: Many butterflies, beetles and other insects from all parts of the world. Write for main list and supplementary list every month. FOR EXCHANGE--same for many rarest insects and others. Send your offer. WANTED--all information regarding breeding of Goliathinae, Dynastinae and other Scarabaeidae. Also, we research living material like Dynastes hercules, neptunus, megasoma, Goliathus, etc. Gerald Pelissie, "Les Granges Noires," 01660 Chaveyrait, FRANCE. (2/4)

FOR EXCHANGE: Small collection of North American Coccinellidae: 16 determined species, 8 misc. undet. species, 176 specimens in all. Will exchange for misc. Carabidae or Cicindelidae from anywhere but Michigan. Gary A. Dunn, Dept. of Entomology, Michigan State University, East Lansing, MI 48824-1115 USA. (2/4).

WANTED: Correspondence with a resident of Japan who has an interest in both Lepidoptera and the Japanese cinema (mostly animated cartoons and monster movies) and who may be a source of merchandise from the movies (specified later) in trade for Lepidoptera or to buy. Send letters to: David Albaugh, 9 Columbia Avenue, Jamestown, RI 02835 USA. (2/4)

WANTED: All papered specimens or livestock (cocoons, pupae, and ovae) of all Saturniidae. Send prices to: David Albaugh, 9 Columbia Avenue, Jamestown, RI 02835 USA. (2/4)

WANTED: Anthing having to do with the moth Argema mittrei, whether it is information, livestock, or papered specimens. Send all lists to: David Albaugh, 9 Columbia Avenue, Jamestown, RI 02835 USA. (2/4)

WANTED: Exchange of Coleoptera, especially Cerambycidae (worldwide). Many types of beetles available from different regions. Gontran Drouin, 50 Principale, Ste.-Henedine, Quebec, CANADA G05 2RO. (2/4)

☞

EXCHANGE: Lepidoptera (worldwide), especially Nymphalidae and Pieride; also other families--Hesperiidae, Papilionidae, etc., and Coleoptera (worldwide), especially Cerambycidae and Scarabaeidae. All letters welcome and answered. Luis R. Perez, HC 02 Box 18881, San Sebastian, Puerto Rico 00755 USA. (2/4).

WANTED: Cerambycidae from all over the world in exchange for specimens from Europe and the Soviet Union. Elvira Barchet, 6470 Clybourn Ave., #242, North Hollywood, CA 91606. USA. Telephone (213)761-3764. (2/4)

FOR SALE OR EXCHANGE: Cocoons of *A. luna*, *A. io lutheri*, and *C. promethea*. SASE for prices. Will also accept desirable papered butterflies with data in exchange for cocoons. Larry J. Kopp, R. Box 30, Klingerstown, PA 17941. (2/4)

FOR EXCHANGE: Will exchange many species of butterflies from Mayalasia, Phillipines, Taiwan, some from Africa, Peru, Brasil, and Europe, all in A1 quality, for A1 specimens from other countries (USA, Canada, Central America, South America, Australia, Indonesia, India, etc.). Exchange preferred, but can also buy. Please write to Patrick M. Malesieux, 87, rue Delhaye 59 148 Flines les Raches, FRANCE. (2/4)

TO EXCHANGE OR PURCHASE: N.A., Neotropical Lepidoptera ova, pupae and cocoons. Offer in exchange fine exotic material. M. Zappalorti, Sr., 123 Androvette Street, Staten Island, NY 10309 USA. (2/4)

WANTED: Worldwide Cicindelidae in trade for worldwide Lepidoptera. Willing to give several different or same species depending of type of Cicindelidae. All letters welcome. Contact: Ryan Bridge, 4329 Old Orchard Rd., York, PA 17402. USA. (2/4)

WANTED: Information on how to receive *Atticus atlas formosanus* ovae, larvae, or pupae. Contact: Ryan Bridge, 4329 Old Orchard Rd., York, PA 17402. USA. (2/4)

WANTED: Cicindelidae and Carabidae (*Carabus*, *Cychrus*, *Scaphinotus*, *Calosoma*, Anthinae only) species and literature. Worldwide beetles available of all families. Cesare Iacovone, Via G. Noventa #12, Scala I--int. 3, 00143, Roma, ITALY. (2/4)

WANTED: Live larvae of any tiger beetles and live true katydids, both female and male. Will pick up anywhere and pay for the catch and phone call. Glenn Firebaugh, 3636 Hoiles, Toledo, Ohio 43612. USA. (419)478-8314. (2/4)

WANTED: Correspondence to exchange information on common indoor spiders. Will identify specimens from the urban-suburban areas of your city (daddy-long-legs not included). Write to: Steven Gades, 1410 West Dunkerton Rd., Waterloo, IA 50703 USA. (2/4)

FOR SALE: Large selection of papered Malaysia Butterflies, beetles, and other insects, all of A1 quality with date. Free catalog available from: DECO ENTERPRISE, P.O. Box 155, TAIPING, Malaysia. (2/4)

HELP AVAILABLE: To Y.E.S. members, ages 17 and up, collecting in the vicinity of Oviedo, Florida, northeast of Orlando. Housing, microscope, and library available with local Y.E.S. member. For more information, contact the Y.E.S. Trading Post. (2/4)

WANTED: Ovae and pupae of the Lepidoptera, especially Saturniidae, Papilionidae, and Nymphalidae. Willing to buy. Send lists and prices to: David Albaugh, 9 Columbia Avenue, Jamestown, RI 01835 USA.

WANTED: All books, new or used, pertaining to entomology, especially Lepidoptera, Coleoptera, Orthoptera, and general entomology. Send lists and prices to: David Albaugh, 9 Columbia Avenue, Jamestown, RI 02835 USA.

FOR SALE: Insect Pins Std. Black, Elephant, Stainless Steel, Minutens and Label Pins. Sizes 000 through 7 available. For complete list write: Ianni Butterfly Enterprises, P.O. Box 81171, Cleveland, OH 44181. USA

FOR SALE: Worldwide collectible butterflies, beetles and rare insects, named with data. For subscription to butterfly and beetle price lists send $5.00 to Ianni Buttefly Enterprises, P.O. Box 81171, Cleveland, OH 44181 USA.

WANTED: Blow flies (Calliphoridae) on loan or for exchange from various regions of the U.S. (particularly the southwest), as part of a study of the distribution of these insects. All material sent will be identified and returned, except for a few specimens retained for the I.D. service. Blow flies are easily collected from raw fish or carrion baits. Send material to Donald Baumgartner, 150 S. Walnut, Palatine, IL 60067 USA.

FOR SALE: Neotropical insects from northern Central America, or will EXCHANGE same for Catocala (Lepidoptera: Noctuidae) especially from Europe, N. Africa, USSR, Central Asia, China or Korea. Also, SELL glassine envelopes in three convenient sizes; take fountain pen and stamp pad ink well. Eduardo C. Welling M., Apartado Postal 701, Merida, Yucatan, MEXICO.

FOR SALE: Worldwide Lepidoptera. Have a good selection of species from various parts of the Amazon region, South America, such as: Morpho, Papilio, Caligo, Agrias, Prepona, Heliconidae and many more. Top quality, papered with complete data. Good prices. Satisfaction guaranteed. Free price list sent on request. Thomas Greager, R.D. #6 Box 56-B, Greensburg, PA 15601 USA (2/2).

EXCHANGE OR PURCHASE: Cicidelidae and Carabidae worldwide. All letters answered. Gary A. Dunn, Dept. of Entomology, Michigan State University, E. Lansing, MI 48824-1115 USA (2/2)

FOR SALE: Handbook of Insect Rearing, Volumes I and II edited by Pritnam Singh and R. F. Moore. This publication provides a practical guide for those who wish to rear insects for the first time. It is a do-it-yourself book, written in a simple, logical style. 474 pp. US $77.75. Available from Elsevier Science Publishers, P.O. Box 1663, Grand Central Station, New York, NY 10163 USA (2/4).

FOR SALE: Elefant brand insect pins. Send SASE for prices. Thomas Greager, R.D. #6 Box 56-B, Greensburg, PA 15601 USA (2/4)

WANTED: Individual(s) interested in exchanging bulk beetle samples from blacklight traps. This could be easily run in the same fashion as the "Y.E.S. Swap Box program. Write to Gary A. Dunn, Dept. of Entomology, Michigan State University, East Lansing, MI 48824-1115 USA. (2/4)

WINTER CATALOG OUT NOW! Even more material packed into our illustrated catalog of butterflies from South America, Africa, Far East, Europe. Top specialists in Morpho, Parnassius (request list). State interests please. Small orders always welcome. Send $1 cash/check for your Catalog by airmail, or $6 for our monthly catalogs and newsletters for one year. Transworld Butterfly Company (YES), Apartado 6951, San Jose, Costa Rica, C. America. (2/4)

WANTED: Livestock of the Buckeye, Junonia (Precis) coenia. Willing to trade or buy. Contact Kathy Miktuk, RD #1 Box 119, Panama, NY 14767 USA. (2/4)

WANTED: Contact with others in Eastern U.S. (especially Virginia) interested in wild flowering plants and the insects and hummingbirds that visit their blossoms. Also predatory insects and spiders that hide among blossoms. Want to exchange information, and may also exchange or purchase specimens of flower visiting insects. Write: Patricia Purdy, 303 Elm St., Salem, VA 24153 USA (2/4).

IDAHO ENTOMOLOGY GROUP: The Group is open to anyone with an interest in entomology. Dues are $4.00 per year (domestic) and $8.00 (overseas). The Group was founded in 1973 and has published a monthly newletter since that time. Monthly meetings and/or field trips are held. Send money to (or request an application form from): Idaho Entomology Group, c/o Museum of Natural History, College of Idaho, Caldwell, ID 83605. Send news items to: Paul E. Blom, Editor, P.O. Box 177, Troy, ID 83871. USA.

WANTED: California Academy of Science Insect drawers, cabinets, or unit trays; determined insect specimens (any group); and journals, books and reprints form College of Idaho Museum of Natural History. Send materials to: William H. Clark, Assistant Director, Museum of Natural History, College of Idaho, Caldwell, ID 83605. ALL CONTRIBUTIONS ARE TAX DEDUCTIBLE!

WANTED: Copy of the Butterfly Book by W. J. Holland. Most recent edition preferred, but not necessary. Will buy for a reasonable price. Kent Hudson, Box 85, Hinsboro, IL 61930 USA. (2/4).

FOR SALE OR EXCHANGE: Many insect orders from the Southeast U.S., including cecropias, Dianas, stag beetles and cicada killers. Quantities very limited. Write for complete details. Bryan Belay, Rt. 1, Box 291, Pearisburg, VA 24134 USA. (2/4).

Zebra swallowtail butterfly; drawn by Michelle Yokoyama (age 8), Corvallis, OR

SUBJECT INDEX TO Y.E.S. QUARTERLY, Vol. 2 (1985)

Compiled by Gary A. Dunn

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